DFCM Roofing Design Requirements

Low Slope Roofing

General Requirements for all low slope roofing systems (New and Replacement)

1- Energy efficient roof design using energy star rated products should be used on roofs. Exception can be taken when Built Up Roofing or EPDM is requested and justified, energy efficient design should still be considered when using these systems.

2- Minimum Manufactures Warranty period should be 20 years on appropriate DFCM roofing Warranty.

3- Minimum Contractor workmanship Warranty period should be 5 years on DFCM contractor Warranty.

4- A DFCM history record is required on all roofing systems (Contractors responsibility).

5- Minimum flashing height requirements are 8" for all mechanical, skylights, wall flashings or any other item that extends above the roof line. This is a minimum flashing height, windows or other such items should be well above 8"above the roof line.

6- All mechanical equipment is required to be set on a roof curb attached to the roof deck. No equipment should sit on insulation.

7- All metal associated with the roof should be 24 gauge, color clad, using standing seam joints where possible. Follow SMACNA guidelines for all metal work. All cap and edge metal should utilize a continuous clip on the outside edge.

8- Only Mechanically fastened or fully adhered systems should be used. No ballasted systems will be allowed on single ply roof systems.

9- No concrete walkway pads are allowed on roof system.

10- Pre-manufactured accessories are required for all pipe flashings, inside and outside corners and any other location pre-manufactured accessories are available.

11- Guidelines of the NRCA, SMACNA, UL and SPRI should be followed when designing roof system and specific details.

12- Where manufacturer's standards show one or more possible approach for compliance to the standard, provide the most stringent approach.

13- Eliminate conflict between roof penetrations, Provide 18" access for installing roofing components.

14- Provide reasonable access to all roof levels for maintenance personnel. Reasonable access is considered to be roof hatches, mounted ladders or door access. Portable ladder access is only considered reasonable on single story roof levels.

15- Determine the need for vapor retarder based on dew point calculations, and facility use.

16- Design for 60m.p.h. minimum wind speed. Refer to local wind speed maps for other wind speed design requirements.

17- The DFCM roofing program manager should review roofing specifications prior to bid.

18- The DFCM roofing program manager should be included in roofing pre-construction meeting and final inspection of roof system.

19- The DFCM Roofing program manager should review and approve any variance from that listed above.

New Construction

1- Roof slope of ¼" is required on all roof systems. Slope should be built into structure on new buildings.

2- Fall protection for maintenance personal should be considered in design. Parapets should be built the appropriate height or anchor points should be included.

Roof Replacements

1- Evaluate the feasibility of using existing insulation, sheet metal and other existing roof system components if they are in like new condition and will not have an adverse effect on the new roof system.

2- Existing roof membrane should be removed.

3- Existing slope should be evaluated and slope added with insulation to improve drainage as conditions allow.

4- Roof diaphragm should be evaluated to determine whether the diaphragm needs to be upgraded to meet current seismic requirements.

5- Roof deck structure should be evaluated to determine the existing dead and live load capacity.

6- Existing roof top equipment should be evaluated and abandoned roof top equipment removed.

Membrane Requirements

PVC – Polyvinyl Chloride

1- Must meet or exceed ASTM D 4434

2- Membrane must be Energy Star Rated.

3- Only sheets with stable or low-migrating plasticizers will be acceptable.

4- 10-year minimum performance history on membrane. Minor formulation changes are acceptable as long as the membrane has a successful history.

5- Membrane must be manufactured with low-wicking scrim.

6- Only balanced sheets will be acceptable. Scrim must be near center of membrane with no less than 20 mils polymer above scrim.

7- Thickness: 60 mil (57mil minimum) polymer thickness not over all thickness. Polymer should be measured between scrim.

8- Must meet or exceed ASTM D 4434 for linear dimensional change and for heat aging.

9- Must meet or exceed ASTM D 5635 for dynamic impact resistance.

10- Must meet or exceed ASTM D 2136 for low temperature flexibility.

TPO – Thermoplastic Olefin

1- Must meet or exceed ASTM D 6878-03

2- 10-year minimum performance history on membrane.

3- Membrane must be manufactured with low-wicking scrim.

4- Only balanced sheets will be acceptable. Scrim must be in center of membrane with no less than 20 mils polymer above scrim.

5- 60 mil (57mil minimum) polymer thickness not over all thickness.

6- Resistance to xenon-arc weathering (ASTM G 155) must be tested and pass a minimum of 17,640 kJ/m2 or 14,000 hours at an irradiance of 0.35 W/m2

7- Must meet or exceed ASTM D 4434 for linear dimensional change and for heat aging.

8- Must meet or exceed ASTM D 5635 for dynamic impact resistance.

9- Must meet or exceed ASTM D 2136 for low temperature flexibility.

10- Membrane must be Energy Star Rated.

EPDM – Ethylene Propylene Diene Monomer

1- Must meet or exceed ASTM D 4637

2- 20year minimum performance history on membrane.

3- Only balanced sheets will be acceptable. Scrim must be in center of membrane with no less than 20 mils polymer above scrim.

4- 60 mil (57mil minimum) polymer thickness not over all thickness.

5- Heat Aging (ASTM D 573) must be tested and pass 28 days @ 240 f. with less than 1% dimensional change.

6- Resistance to xenon-arc weathering (ASTM G 155) must be tested and pass a minimum of 17,640 kJ/m2 or 14,000 hours at an irradiance of 0.35 W/m2

7- Must meet or exceed ASTM D 2137 for low temperature flexibility must be tested using the dynamic impact test.

B.U.R. - Built Up Roofing

1- Type III (3) asphalt should be used at a minimum. Type IV (4) asphalt should be used if slope is greater than ¼".

2- Low fuming asphalt should be used.

3- Cold process B.U.R. is acceptable and preferred on sites that smell is a concern.

4- Minimum of type VI (6) felts and a 4-ply system should be used.

5- Minimum #4 lb lead is required for all drains and any other location lead is used for flashing material.

6- Surfacing should be an Energy Star rated SBS modified FR cap sheet with granules where possible otherwise aggregate should meet requirements of ASTM D 1863, 3/8" or 9mm nominal.

7- No EPS insulation will be allowed in any B.U.R. system.

Other System requirements

1. The DFCM Roofing program manager should review and approve any hybrid, non typical roofing system.

Insulation Requirements

1- All insulation in the roofing system must be covered under the appropriate DFCM manufacture warranty for low slope roofing.

2- All insulation incorporated into roofing system must be approved and documented as a UL rated assembly that meet code requirements of the building roofing system is installed on.

3- Long Term Thermal Resistance (LTTR) should meet current code and the requirements of the building.

4- Insulation should always be installed in a minimum of two layers with joints staggered in both directions. The only exception is when all that is required is a cover board.

5- All insulation stored on project site should be covered to protect from UV and water. The factory wrap is not an acceptable cover material.

6- All insulation stored on project site should be elevated off the ground or the roof deck to protect from moisture.

Low Slope Manufacture Requirements

1- Manufacture must be listed in NRCA's low slope roofing materials guide.

2- Manufacture must have a 10-year successful history as a roofing manufacture.

3- Manufacture must show documented proof of how they plan to meet warranty obligations. Must be provided in contractor's submittal package.

4- Manufactures must agree to and be willing to sign the appropriate State of Utah (DFCM) manufactures warranty for the roof system. The DFCM warranty not the manufactures standard warranty will be required at project completion.

5- Manufacture must have a certified installer/contractor program. This program must include continuing education for the contractor.

6- Contractor must submit a pre-installation noticed from manufacture prior to start of any work. This will include confirmation that the membrane and all accessories being used meet requirements of specification. This will also include confirmation that the scope of work is in accordance with published technical data as per manufacture. This also includes confirmation that a warranty has been requested and will be issued on the DFCM manufacture warranty form at the completion of roofing. This document must be included in contractor's submittal package.

7- Manufacture will provide at no additional cost to owner, start up meeting, progress inspections and a final warranty inspection at project completion by a full time technical representative. Manufacture required inspections should be listed in specifications. All inspections will be scheduled by project architect.

8- Any portion of specification that does not meet manufacture requirements will be installed per manufacture requirements at no additional cost to owner. Any portion of the specification that exceeds the manufacture minimum requirements will be installed according to specifications not manufacture minimum requirements

9- Manufacture must have a history of meeting Warranty obligations.

10- Manufacture is required to release all inspection reports concerning warranted roof system to the contractor to submit to project architect.

Contractor Requirements

1- Contractor must have Five (5) years experience as a roofing contractor.

2- Contractor must have Five (5) years experience with the specified product.

3- Contractor must be a Manufacture certified installer of roofing system to be installed.

4- Contractor must document continuing education for the foreman that will daily oversee the work on the roofing system. A minimum of 12 hours per year is required.

5- On site foreman must be able to clearly communicate with building owner/occupants.

6- Contractor will provide a 24 hour emergency phone number to project manager and agency contact person.

7- Contractor must be legally licensed to perform roofing work in the State of Utah and carry liability insurance as required by State of Utah law.

8- Contractor must be willing to sign and agree to the terms of the DFCM 5-year contractor roofing warranty.

Warranties and History records

1- Single ply roofing warranty

2- Bituminous roofing warranty

3- Contractor 5-year warranty

4- Single ply history record

5- Built Up history record

Steep Slope Roofing

General Requirements

1- With the vast array of steep slope products available no specific requirements have been set forth. The following items should however be considered.

2- Any product used in steep slope roofing should have a proven history and be recognized by the NRCA.

3- All eves should overhang the wall a minimum of 16".

4- Ice and water shield should extend up the roof 3' past/inside the warm wall.

5- Valleys and gutters should be designed so ice dams will not be created.

6- All rain gutters, downspouts and internal drain systems are required to have high quality heat cable that is thermostatically controlled.

7- Only concealed fasteners will be acceptable in metal roofing. No exposed fasteners will be allowed.

8- Minimum of a 10 year leak free manufactures warranty is required on all steep slope roof systems.

9- No three – tab shingles are allowed. 30 year minimum laminated shingles should be used.

10- Roof pitch should have slope of greater than 4/12. Any slope less than 4/12 should have full ice and water shield installed.

11- All material and details should meet the requirements of ASTM, NRCA, SMACNA, UL and FM.

12- Minimum of #30 felt should be used as under-layment.

13- Minimum Contractor workmanship Warranty period should be 5 years on DFCM contractor Warranty.

14- A DFCM history record is required on all roofing systems.

15- The DFCM Roofing program manager should review and approve any variance from that listed above.

Roof Replacements

1- If there is more than one existing roof, existing roofing should be removed before new roof is installed.

2- Provide adequate ventilation.

3- Roof diaphragm should be evaluated to determine whether the diaphragm needs to be upgraded to meet current seismic requirements.

4- Roof deck structure should be evaluated to determine the existing dead and live load capacity.

Manufacture requirements

1- Manufacture must be listed in NRCA's steep slope roofing materials guide.

2- Manufacture must have a successful 10-year history as a roofing product manufacture. (manufacture only not product)

3- Manufacture must show documented proof of how they plan to meet warranty obligations.

4- Manufacture must have a certified installer/contractor program. This program must include continuing education for the contractor.

5- Contractor must submit a pre-installation noticed from manufacture prior to start of any work. This will include confirmation that the membrane and all accessories being used meet requirements of specification. This will also include confirmation that the scope of work is in accordance with published technical data as per manufacture. This also includes confirmation that a warranty has been requested and will be issued at the completion of roofing. This document must be included in contractor's submittal package.

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5- On site foreman must be able to clearly communicate with building owner/occupants.

6- Contractor will provide a 24 hour emergency phone number to project manager and agency contact person.

7- Contractor must be legally licensed to perform roofing work in the State of Utah and carry liability insurance as required by State of Utah law.

8- Contractor must be willing to sign and agree to the terms of the DFCM 5-year contractor roofing warranty.

Warranties

1- DFCM contractor warranty

2- Manufactures warranty to be issued from manufactures standard

3- Steep slope history record